

Environmentally Friendly

Restoration of the Natural Environment
and Superior Revegetation

Erosion Control Mat

Takino Filter



Erosion Control Mat Takino Filter

Takino Filter is an erosion control mat protecting the soil from various weather conditions.

Takino Filter mats provide achievable permanent vegetation while controlling soil erosion and retaining soil moisture, just by arranging the mat on the slope.



SP-45

◆Main Feature and Function

- ▶ Prevents soil erosion caused by heavy rainfall and controls muddy water.
- ▶ Protects the soil from drought with its high water retention capacity and evaporation suppression.
- ▶ Provides coverage to prevent strong winds from blowing sand.
- ▶ Early greening can be realized by use in combination with the conventional greening method (seed spraying method = hydroseeding).

◆Competitive Advantage

- ▶ Compared with general erosion control mats, Takino Filter is lightweight, easy to handle and no heavy machine is needed for construction.
- ▶ The mats, which are made of polyester nonwoven fabric with 97 to 98% porosity, are light and flexible, so they can adhere to uneven slope surfaces, and the high porosity allows the rainwater to drain out smoothly.
- ▶ In 2017, it was evaluated based on the ASTM standard methods for evaluating erosion control mats by Erosion Control Technology Council (ECTC), and its high erosion prevention and water retention functions were confirmed.

〈Results of ASTM test of erosion control mats defined by Erosion Control Technology Council〉

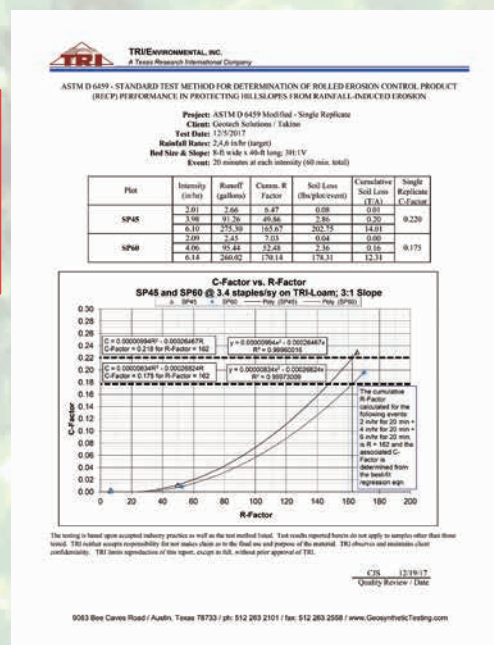


No turbid water

【Erosion control ability of Takino Filter SP-45, SP-60】

High erosion prevention function was confirmed under conditions of rainfall of 50 mm / h and 100 mm / h every 20 minutes.

Erosion ability ASTM D6459



Function of Takino Filter

◆Prevention of Soil Erosion

When it rains, the web adhering to the soil surface reduces the raindrop impact and prevents the bond strength of surface soil particles from being destroyed.

Then once the soil is saturated with rainwater, Takino Filter mats allow the rainwater to drain out smoothly both through the web inside and along its surface.

〈Large Scale Rainfall Simulation at National Research Institute for Earth Science and Disaster Resilience 1991〉



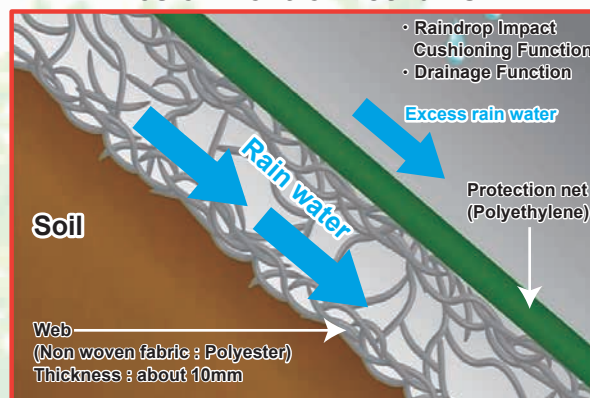
Conventional mat



Takino Filter

(Comparison of runoff after 10 min. of 100mm/hour rainfall)

Erosion Control Mechanism



〈Adhesion between mats and ground〉



The web (nonwoven fabric randomly arranged with water-repellent fibers) has a unique structure keeping the soil particles in close contact with the soil surface. This prevents surface soil run off.

◆Drought Protection

The web suppresses evaporation with excellent water retention, stopping the soil from drying out.

This anti-evaporation effect prevents drought damage and provides achievable permanent vegetation.

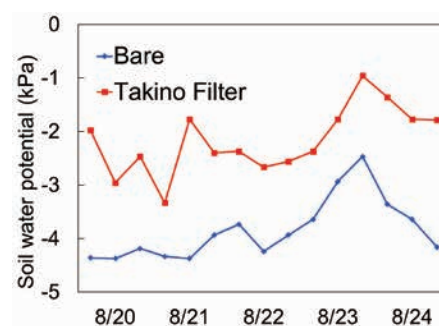
【Water retention capacity of Takino Filter SP-45, SP-60】

SP-45 and SP-60 showed high water retention.

Water retention capacity ASTM D7367



Soil water potential under 12 cm from the soil surface



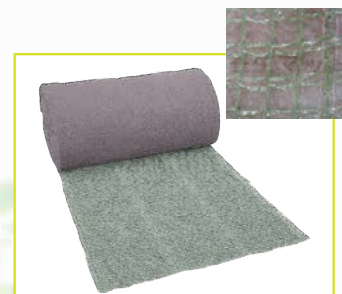
(Experiments at Faculty of Agriculture, Yamaguchi University In August, 1998)
Compared to bare land, the Takino Filter mats showed a high soil water potential, and the soil moisture evaporation prevention effect was confirmed.

Product Type

◆Takino Filter Type SP, Type SP-wn

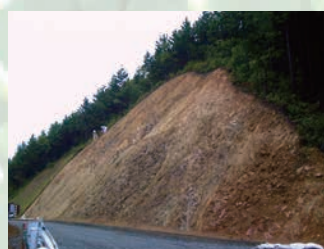
Type SP

Takino Filter SP-45 or SP-60 is a product consisting of nonwoven fabric called web and protection net. It is commonly applied to a slope for preventing soil erosion and turbid water, as well as for developing a growth bed to introduce natural vegetation. In addition, it even achieves stable vegetation in conjunction with seed spraying by applying it for the protection of sprayed materials on the slope surface.



Product Specification				Web		Protection Net	
Grade	Width	Length	Weight	Material	Color	Material	Color
SP-45	1.0m	50.0m	Gross 4.4kg Net 4.1kg	Polyester	Light brown	Polyethylene	Dark green
SP-60	1.0m	50.0m	Gross 5.1kg Net 4.8kg	Polyester	Light brown	Polyethylene	Dark green

SP - 45 in conjunction with seed and local soil spraying



① Before construction



② After seed and soil spraying



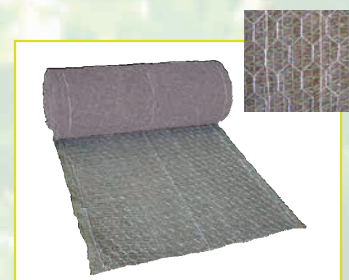
③ Just after installation of SP-45



④ 2 months later

Type SP-wn (SP with wire net)

Takino Filter SP-45wn is a product consisting of SP-45 and hexagonal wire mesh. It is designed for the undulating slopes, the steep slopes, and the slopes where small rock-falls are likely to happen.



Product Specification				Web		Protection Net		Wire Mesh	
Grade	Width	Length	Weight	Material	Color	Material	Color	Material	Color
SP-45wn	1.0m	20.0m	Gross 7.3kg Net 7.1kg	Polyester	Light brown	Polyethylene	Dark green	Galvanized iron wire	Silver

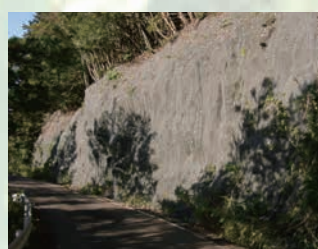
SP - 45wn



① Before construction



② Just after construction



③ 11 months later



④ 13 years later

Takino Filter Installation Manual

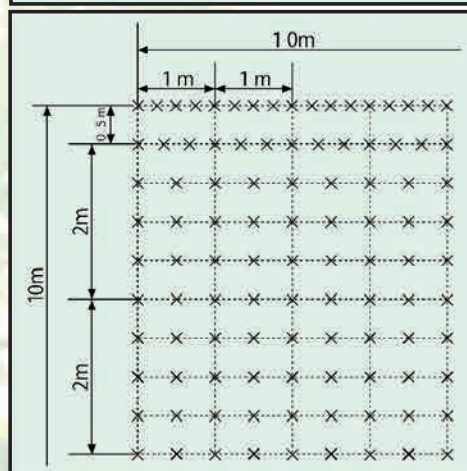
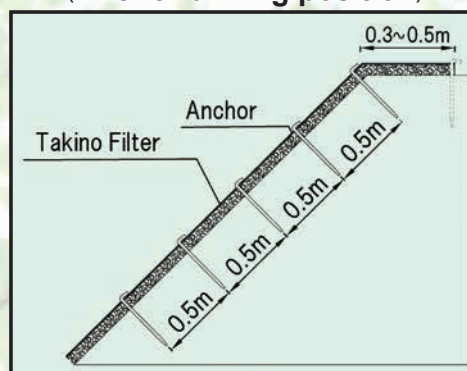
◆Precautions

- ▶ Before installation, shape the slope surface as smoothly as possible.
- ▶ Clean the slope shoulder and surface by removing garbage, loose rocks, loose soil, and weeds.
- ▶ Remove any remaining weeds or tree roots, as they cause the mats to detach from the ground and reduce the effect.

◆Installation Instruction

- ▶ Begin the installation at a distance of 30 cm to 50 cm from the top edge of the slope, then fix the ends with anchors.
- ▶ Arrange the mat while supporting the mat with your leg. Arrange the mat carefully so that the mat is in full contact with the slope surface. Never pull or stretch the mat.
- ▶ Insert anchors at the specified positions.
- ▶ When connecting the mats along a slope, make sure the upper mats are on the top of the lower mats before inserting anchors. In such a case, the overlap with the next row should be 3 cm at least and 5 cm at most. The overlap between the top and bottom should be 5 cm at least and 10 cm at most.

〈Anchor driving position〉



Anchors 471pcs./ 100 m²



① Fixed on the top of slope shoulder



② Covered on the slope surface



③ Fixed on the slope surface



④ Several sheets laid and fixed at the overlaps

Application Examples

◆Road Related Project

Highway development project: SP-45 **in conjunction with seed and soil spraying**



① Before construction



② Just after construction



③ 3 years later

Tunnel related project: SP-45 **in conjunction with seed and soil spraying**



① Before construction



② Just after construction



③ 7 years and 3 months later

Highway development project: SP-45



Just after construction



Just after construction

◆Mountain Road Project

Forestry road project: SP-45



① Under construction



② 1 year later



③ 3 years later



④ 7 years later

Forestry road project: SP-45



① 9 months later



② 3 years and 9 months later



Forestry road improvement project : SP-45wn in conjunction with seed and soil spraying



① Before construction



② Just after construction



③ 1 year and 2 months later



④ 13 years later

Application Examples

◆Disaster Restoration Project

Afforestation project: SP-45 in conjunction with seed and local soil spraying



① Just after construction



③ 3 years later



② 11 months later



④ 13 years later

Afforestation project: SP-45 in conjunction with seed and borrow soil spraying



① Under construction of SP-45 after seed and soil spraying



② 8 months later



③ 1 year and 8 months later

Restoration project for Kumamoto earthquake disaster



① Before construction



② 8 months after construction start



③ 1 year and 8 month after construction start

Restoration project for Kii Peninsula flood disaster



① 4 months after construction start



② 1 year and 6 months after construction start

Application Examples

◆Special Application

Project for Bed Rock : SP-45 in conjunction with lath wire mesh for rockfall prevention



① Before construction



② Just after construction



③ 1 year and 5 months later

Project for Special Soil (red clay soil): Installation of SP-45 after seed spraying



① Before construction



② Just after construction



③ 3 years later



① Before construction



② 7 years later

◆ Overseas Application

Indonesia

Mt. Batur, Indonesia: SP-60



① Just after construction



② 2 years later



Sumatra, Indonesia: SP-60



① Before construction



② Just after construction



③ 3 months later



Application Examples

◆ Overseas Application

Indonesia

Japanese industrial estate A, Indonesia: SP-60



① Just after construction



① Just after construction



② 8 months later



② 1 year and 2 months later

Japanese industrial estate B, Indonesia: SP-60



① Just after construction



② 3 months later

Trans Sumatra Highway Project, Indonesia: **Installation of SP-60 after seed and fertilizer spraying**



① Before construction



② Just after construction

◆ Overseas Application

China

Highway Project, Inner Mongolia: **SP-45 in conjunction with seed spraying**



① Under construction



② 1 year later

◆ Overseas Application

Timor-Leste

National Road, Timor-Leste: ① SP-60 ② **SP-60 after seed spraying**



① Before construction



② Under construction



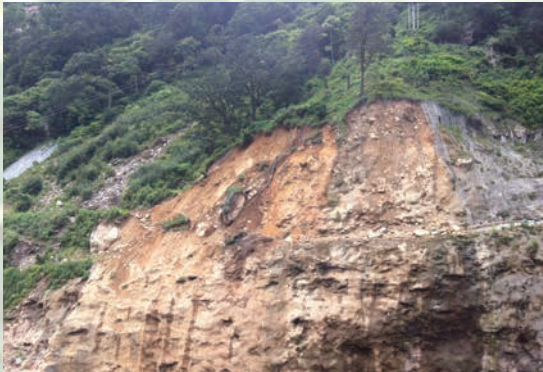
③ Just after construction

Application Examples

◆ Overseas Application

Bhutan

Dam slope, Bhutan: SP-45 in conjunction with the Non-frame method



① Before construction



Photo provided by Nippon Steel Material products Co., Ltd.

③ After construction



② Under construction



◆ Overseas Application

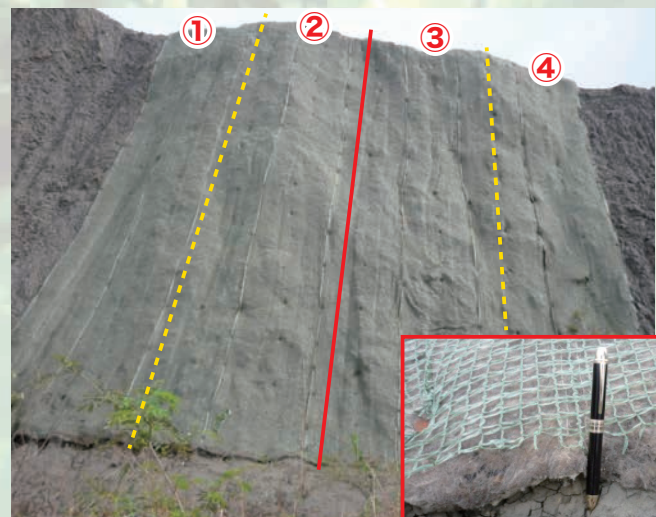
Taiwan

Tianliao Moon World, Taiwan (Mudstone zone)

① SP-60 ② SP-45 ③ SP-45 in conjunction with seed spraying ④ SP-60 in conjunction with seed spraying



① Before construction



② 27 months later



◆Corporate Profile

Name	Takino Filter Inc.
Foundation	June, 6, 1994
Head Office	2-904-16, Hayama, Kudamatsu, Yamaguchi, 744-0061 Japan
Offices	7 regional offices in Japan
Capital	50,000,000 JPY
Employees	50 staff
Business	Manufacture and sales of products for Erosion Control Mat “Takino Filter”



(As of March, 2020)

◆Corporate History

1994	Established Takino Filter Inc.
1998	Registered as system for the provision of new technology (NETIS), JAPAN 【Ministry of Land, Infrastructure, Transport and Tourism】
2001	Product certification by technical review of Public Works Research Center, JAPAN
2006	Acquired ISO 9001 : 2000 certification
2012	Adopted “Project Formulation Survey” under the Governmental Commission on the Project for ODA Overseas Economic Cooperation, INDONESIA 【Ministry of Foreign Affairs】
2013	Adopted Pilot Survey for Disseminating SME’s Technology (JICA), INDONESIA
2017	Evaluated by ASTM standard test methods at TRI Environmental, Inc., USA
2019	Registered Sustainable Technology Promotion Platform (STePP) of United Nations Industrial Development Organization (UNIDO)
2020	Adopted SDGs Business Verification Survey with the Private Sector (JICA), PHILIPPINES

◆Overseas Information

Sales Destination : Indonesia, Timor-Leste, Bhutan, Philippines, China, Taiwan, Honduras, El Salvador,
Thailand, Vietnam

*Overseas business started from 2012.

(As of March, 2020)

Registered Sustainable Technology Promotion Platform (STePP) of United
Nations Industrial Development Organization (UNIDO)

URL : http://www.unido.or.jp/en/activities/technology_transfer/technology_db/
About Takino : http://www.unido.or.jp/en/technology_db/5839/



Takino Filter Inc.

Unique Erosion Control Technology and Environmental Restoration Vegetation Mats





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